The Perils of Mandatory Disclosure of Private Interconnection Agreements Between Internet Networks

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Introduction

Several commenters have requested that the Federal Communications Commission expand the Open Internet inquiry to encompass interconnection transactions at the Internet's "core." These calls followed announcements that Netflix would pay to connect its servers directly to the Comcast and Verizon networks, rather than relying on third-party networks to deliver its content to consumers. Spurred by concerns about content providers paying broadband providers to carry their traffic, these commenters have sought greater transparency in the interconnection market. Some have called upon the Commission to require that all such interconnection agreements be filed with the agency and their terms made public. But left open is the question of whether this greater transparency would benefit consumers.

The Commission has quite properly explained that the interconnection market lies outside the scope of the current docket. The Open Internet NPRM has focused upon the extent to which broadband providers can prioritize different types of Internet traffic over the so-called "last-mile" networks that carry information from the Internet to consumers. Whatever the merits of the proposed rules, they are distinct from the question of how various companies connect to each other in purely business-to-business transactions to form the network of networks known as the Internet. Chairman Tom Wheeler has correctly explained that interconnection is "not a net neutrality issue" and as a result, says a Commission spokesman, "[p]eering and interconnection are not under consideration in the Open Internet proceeding."

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More fundamentally, interconnection is a competitive and innovative market that displays few if any signs of market failure justifying regulatory intervention. Network providers have negotiated connection agreements to exchange traffic since the advent of the Internet—sometimes for free and sometimes on a paid basis. Content providers can choose from a plethora of Internet service providers to carry their traffic from their servers across the Internet to consumers. Internet transit prices have fallen precipitously each year since broadband's inception, and many networks operate on razor-thin margins. Netflix's interconnection agreements are simply the latest in a series of examples of the market constantly evolving in response to changes in technology and demand. With a healthy, competitive ecosystem, regulatory interference risks ossifying the process and halting network providers' ability to adapt to new content and applications.

The proposed requirement that networks publicly disclose the terms of their interconnection agreements could harm that competition. It is a basic tenet of economic and industrial organization literature that sharing competitively sensitive information among rivals can facilitate tacit collusion. The Supreme Court, antitrust authorities, and even this Commission have stressed that disclosure of price and cost information can be particularly harmful to competition, especially in markets that display significant barriers to entry. Even absent collusion, price sharing can negatively impact firms' willingness to discount and therefore can lead to supracompetitive prices. Because of this potential effect on competition, the Commission should reject calls to mandate public disclosure of the terms of private business-to-business interconnection agreements.

I. Interconnection Markets are Robust and Highly Competitive

A. Overview of the Interconnection Market

Traditionally, the Commission has focused primarily upon the residential broadband market, and to a lesser extent, the market for commercial end-user broadband access. For example, the 2010 Open Internet rules applied only to "broadband Internet access service," which the Commission defined as "a mass-market retail service…that provides the capability to transmit data to and receive data from all or substantially all Internet endpoints" that is "marketed and sold on a standardized basis to residential customers, small businesses, and other end-user customers such as schools and libraries."[1] Similarly, the 2010 National Broadband Plan focused upon six long-term goals largely aimed at connecting homes and communities to broadband networks, consistent with Congress's directive that the agency "ensure that every American has 'access to broadband capability.'"[2] For years, end-user broadband service has been sold primarily as subscription-based model within which the consumer purchases a publicly-advertised monthly plan for Internet access, which buys either unlimited monthly service or unlimited service up to a monthly limit, with a per-unit overage charge for exceeding the customer's allotted consumption.

But upstream into the Internet ecosystem, the interconnection market is much more complex and dynamic. Commentators often describe the Internet, accurately, as a "network of networks." Interconnection agreements stitch this network together. Professor Christopher Yoo describes the interconnection market as a "collection of 35 thousand autonomous systems bargaining with one another through arms-length transactions" to shuttle traffic among the Internet's end-points.[3] As one might expect, these agreements inevitably contain wide variations

[1] *Preserving the Open Internet: Broadband Industry Practices*, 25 FCC Rcd. 17905, 17932 (2010).
[2] CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN at xi, xiv-xv (2010).
[3] Christopher S. Yoo, THE DYNAMIC INTERNET: HOW TECHNOLOGY, USERS, AND BUSINESSES ARE TRANSFORMING THE NETWORK at 55 (2012).

in the terms under which parties interconnect and exchange traffic with one another.[4] Interconnection agreements can run hundreds of pages, governing a wide range of conditions, and are typically covered by non-disclosure agreements that reflect the competitively sensitive nature of those terms.

1. Transit Service

Much of the concern about Netflix's interconnection agreements stem from the misconception that Internet content providers typically pay nothing to deliver their traffic to the Internet. In fact, these providers often purchase connectivity from one or more Internet transit providers. In simplified form, Internet transit service is a business relationship whereby a network sells Internet access.[5] A content provider signs an agreement with a transit provider, which agrees to deliver the client's content to all Internet destinations. The transit provider then enters into interconnection agreements with other networks upstream to provide those pathways to any Internet destination.

Internet transit is typically sold on a metered basis, using the 95th percentile measurement method.[6] Through this method, the transit provider measures the amount of traffic to or from the customer every five minutes for a month. At the end of the month, each of these samples is converted to a megabit-per-second figure and the samples are rank-ordered from largest to smallest. The 95th percentile figure is used to represent the customer's monthly volume, and is multiplied by the transit agreement's per-Mbps unit price to calculate the customer's monthly

[4] *Id.*
[5] William B. Norton, THE INTERNET PEERING PLAYBOOK: CONNECTING TO THE CORE OF THE INTERNET at 28 (2013).
[6] *See id.* at 30-32.

bill.[7] Many transit providers provide a unit-price discount if the customer agrees to a minimum guaranteed amount of monthly traffic, known as a "commit."[8]

2. Peering

As an alternative to purchasing transit service, two networks may agree to enter into a peering agreement. Peering is a business relationship in which two companies agree reciprocally to provide access to each other's customers.[9] Peering is often done on a settlement-free basis, meaning that the two partners agree to exchange traffic without billing one another based on the traffic flow. Many settlement-free peering agreements are between networks of comparable size, where the flow of traffic in each direction is roughly equal and therefore the transaction costs of metering would be greater than the net monthly payout. But some peering agreements are on a paid basis, whereby one party agrees to pay the other as a condition of peering.

Peering and transit are related but distinct products. Peering provides a company access only to the peering partner's end-user customers. It does not guarantee that the traffic exchanged will be forwarded on to Internet points that are not within the peering partner's network. As Norton explains, "Internet Transit is a service that provides access to the global Internet, while Internet Peering simply provides a more direct path for a subset of the traffic."[10] Peering may be advantageous because it is cheaper than the equivalent service, or because direct access to the peering partner's customers reduces the number of "hops" between end-points and therefore improves the quality of the transmission. But because transit exists as an alternative to peering, peering prices are disciplined by transit markets as the next-best alternative.

3. Other Innovations: Content Delivery Networks and Server Farms

[7] *Id.*
[8] *Id.* at 32.
[9] *Id.*
[10] *Id.* at 66.

Content providers may also choose to rely upon a content delivery network rather than transit or peering to deliver their traffic to the Internet. Like transit providers, CDNs sell content providers access to the Internet. But rather than arrange transport across the Internet from the content provider's servers to consumers, CDNs maintain a distributed network of servers around the country, and enter into transit or (typically paid) peering agreements with end-user broadband networks. The CDN maintains a copy of the client's content on each server, and when requested, will deliver the content from one of its servers directly to consumers. Because the content is stored closer to its destination and traverses fewer interconnections, CDNs can be a high-quality, low-cost alternative to transit.

Some content providers have also begun building server farms to cache and distribute their content locally. These server farms act like company-owned content delivery networks, interconnecting directly with broadband providers and bypassing the public Internet completely. Like CDNs, server farms shorten the pathway from server to consumer and thus reduce the possibility that congestion will reduce the quality of the transmission, and also may provide cost savings compared to traditional transit. Professor Yoo notes that Google, Yahoo!, and Microsoft have used server farms to bypass the public Internet for roughly one-third of their total traffic.[11]

B. Interconnection Markets are Competitive

As noted above, content providers have a wide range of options to choose from when deciding how to deliver their content to consumers. Some transit providers have a nearly global network footprint, while others operate more regionally and rely more heavily on interconnection agreements to route traffic to end-users.[12] Some providers offer only transit, while others provide

[11] Yoo at 68.
[12] See Dan Rayburn, *How Transit Works, What it Costs & Why It's So Important*, Feb. 24, 2014, available at http://blog.streamingmedia.com/2014/02/transit-works-costs-important.html.

a variety of complementary services as well.[13] And as noted above, some content providers may find peering or CDN delivery to be a competitive alternative to traditional transit service.

It is also worth noting that content providers and transit providers need not rely upon a single interconnection agreement to process their traffic. Rather, many content and transit providers will maintain multiple pathways through which traffic can reach end users, a practice known as "multi-homing." By securing multiple pathways to an end-user, multi-homing helps a provider offer greater reliability and reduces the market power that a single network may otherwise wield over the flow of Internet traffic.[14]

Price trends demonstrate the competitive nature of interconnection markets. Though pricing schedules are often protected by nondisclosure agreements, there is a general consensus that competition has driven down Internet transit prices precipitously and continuously each year since the Internet's inception. Interconnection consultant William Norton calculates, based on informal surveys, that the average per-Mbps price for non-commit transit service has fallen from $1200 in 1998 to $12 in 2008 and $0.94 in 2014—an average rate of over 30 percent each year.[15] While Norton notes that the individual data points are only "rough indications" of price, the "trend is unmistakable, and no one would disagree."[16] Similarly, research firm TeleGeography estimates that American transit prices have fallen 26% annually from 2007 to 2012, and the rate of decline is increasing.[17]

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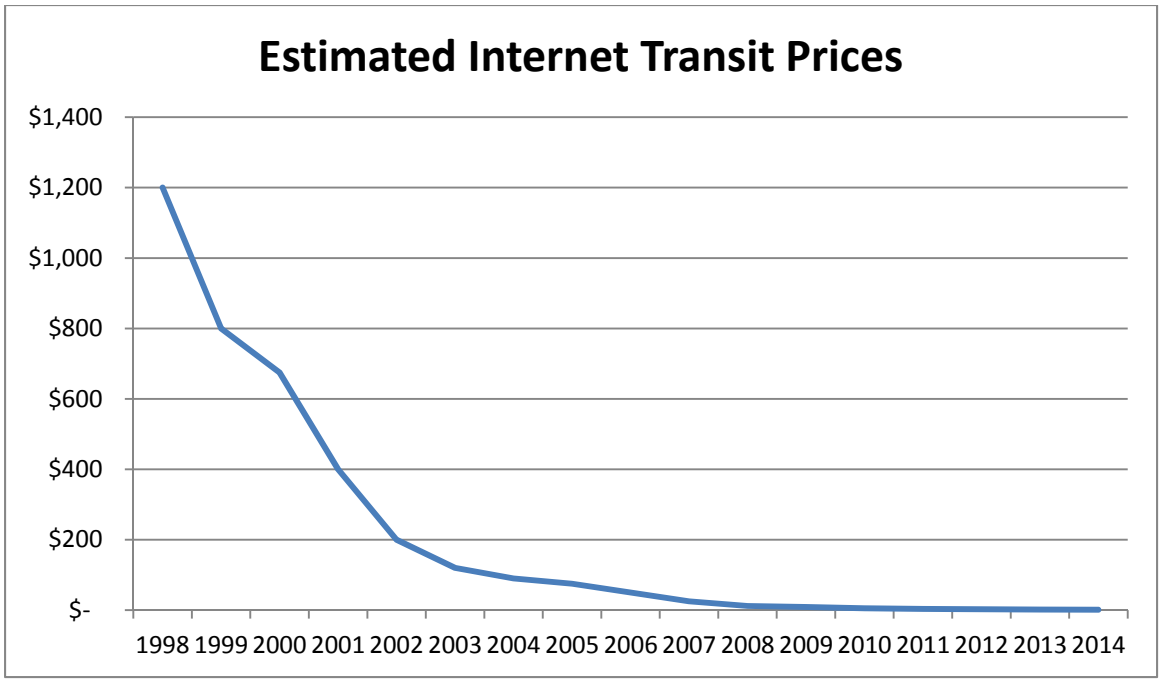
[13] *Id.*
[14] See Yoo at 62-64.
[15] Norton at 34.
[16] *Id.*
[17] See TeleGeography Press Release, *IP Transit Prices Steepen*, Aug. 2, 2012, available at http://www.telegeography.com/products/commsupdate/articles/2012/08/02/ip-transit-price-declines-steepen/.



Source: William B. Norton, INTERNET PEERING PLAYBOOK 2013

Like the transit market, CDN prices are not generally made public, but studies suggest that CDN prices are falling at rates roughly comparable to transit prices. Streaming Media Analyst Dan Rayburn estimates that CDN pricing is down 20-25 percent from 2012 to 2013, and he expects even greater declines in 2014 and 2015.[18] Given that transit and CDN services are quasi-substitutes, one should not be surprised to see similar pricing trends in both markets.

C. Interconnection Markets are Dynamic and Evolving

Moreover, the array of interconnection services has evolved over time in response to the growth in the volume and diversity of Internet users, content, and applications. As Professor Yoo has explained at length, when the Internet backbone was privatized in the 1990s, the Internet reflected a hierarchical structure similar to the traditional telephone network: last-mile networks serving end-users contracted with regional ISPs, each of which in turn contracted with a private backbone provider to carry traffic to the Internet. These backbone providers interconnected at

[18] See Dan Rayburn, The State of the CDN Market, May 2014, available at http://www.streamingmedia.com/dansblog/2014CDNSummit-Rayburn.pdf.

one of four public peering points to exchange traffic with one another and route it back down. Traffic thus flowed from the sender's last-mile provider up to a public peering point, over to another backbone provider, then back down again to the last-mile provider serving the recipient.[19]

But as these standard pathways became congested, networks entered into alternative agreements such as private peering and secondary peering agreements to exchange traffic without having to traverse the path through a public peering point. Today, the old up-over-down hierarchy has been replaced by a lattice of interconnecting networks that provide multiple potential pathways for traffic to get from one point to another. The existence of multiple pathways for any given Internet transmission helps alleviate congestion and makes the marketplace more competitive, as "the presence of alternative paths to connect to the Internet naturally limits every market participant's ability to raise price."[20]

Notably, these innovative new interconnection arrangements coincide with disruptive changes in interconnection markets or in adjacent content and application markets. Norton explains that private peering among cable providers became necessary following the bankruptcy of the cable industry's primary Internet Service Provider, @Home, in 2001, coupled with the rise of peer-to-peer networking traffic that made settlement-free peering more cost-efficient than transit.[21] Similarly, it is no coincidence that some providers of bandwidth-intensive video content such as Netflix are significant customers of CDN providers, and that others such as Apple and Google are leaders in the server farm market. This content is unusually susceptible to Internet congestion, which drove demand for alternatives to traditional public Internet transit services.

[19] Yoo at 58-59.
[20] *Id.* at 63 (citing sources).
[21] William Norton, Evolution of the U.S. Peering Ecosystem, available at http://drpeering.net/white-papers/Ecosystems/Evolution-of-the-U.S.-Peering-Ecosystem.html.

D. Placing the Netflix Interconnection Agreements into Context

Netflix's direct interconnection agreements reflect this broader evolutionary trend and show how the competitive marketplace can adapt to meet content providers' needs. It is a mistake to suggest, as some commenters have, that Netflix's interconnection deals with Comcast and Verizon reflect a new cost to the company. It would be more accurate to say that the company has shifted some transit costs from one network to another. Rather than paying third-party transit providers and content-delivery networks to carry traffic to Comcast or Verizon networks, Netflix appears to have entered a paid peering relationship to interconnect directly to those networks. In essence, Netflix has cut out the middleman.

Dan Rayburn suggests that the move was a rational response to changes in the Internet ecosystem. For over a year, transit provider Cogent Communications has been locked in a public peering dispute with Verizon. Cogent's increasing volume of Verizon-bound traffic exceeds the capacity of the existing connections between the Cogent and Verizon networks.[22] Cogent and Verizon reached an impasse over the cost of upgrading these connections and the transit fees, if any, that Cogent should pay for the increased volume. In the meantime, Cogent's customers, including Netflix, began suffering delays due to the dispute. Rayburn suggests that a similar dispute is likely responsible for the decline in the quality of Netflix quality to some Comcast customers.[23] Rather than suffer collateral damage from this interconnection dispute, Netflix made the reasonable decision to interconnect directly with Comcast and Netflix and reduce the number of hops from its content to its customers.

[22] See David Young, Unbalanced Peering, and the Real Story Behind the Verizon/Cogent Dispute, June 19, 2013, available at http://publicpolicy.verizon.com/blog/entry/unbalanced-peering-and-the-real-story-behind-the-verizon-cogent-dispute.

[23] See Dan Rayburn, *Here's How the Comcast & Netflix Deal is Structured, With Data & Numbers*, Feb. 27, 2014, available at http://blog.streamingmedia.com/2014/02/heres-comcast-netflix-deal-structured-numbers.html.

Nor are these the first direct interconnection agreements Netflix has signed, although they likely represent the first that were not on a settlement-free basis. But the company is hardly the first content provider to enter into a paid peering arrangement. As noted above, several prominent Internet content providers have built server farms to bypass parts of the public Internet, relying at least in part on direct interconnection with broadband providers to do so. In fact, Comcast has an entire business unit dedicated to selling interconnection services.[24] Amazon, Google, and Facebook are among the content providers who have "eliminated the middleman" and signed direct interconnection agreements with Comcast.

Nor should policymakers be unduly concerned that interconnection agreements allow broadband providers to exploit their unique positions in the Internet's architecture in ways that harm consumers. Telecommunications law has long been concerned with the control that last-mile network providers maintain over so-called "bottleneck" facilities to consumers, because ownership of access networks may give rise to concerns about market power in access markets. But as an initial matter, it is worth noting that in this instance, both parties to an interconnection agreement occupy a strategically important position: while Comcast owns the final path to the end-user, Netflix owns the initial path from the company's servers. With 35 million subscribers who are responsible for up to one-third of all North American Internet traffic during peak hours, Netflix's bargaining position is far from ephemeral. When negotiating the terms of their interconnection agreement, both companies have leverage, because a holdout on either side could preclude a deal.

More generally, agreements that eliminate a middleman are typically efficient and welfare-enhancing. In this case, Comcast maintains interconnection agreements with a wide

[24] See Lance Ulanoff, *The Comcast-Netflix Deal: Fact vs. Fiction*, Feb. 26, 2014, available at http://mashable.com/2014/02/26/comcast-netflix-net-neutrality/.

range of transit providers and CDNs, many of which Netflix could choose instead of direct interconnection to deliver traffic to Comcast consumers.[25] The fact that Netflix chose direct interconnection suggests that it found this to be the best alternative, either because the price was better or the quality of the service is worth any price premium.[26] Unsurprisingly, since the agreement was signed Comcast customers have seen improved performance from Netflix, because the data travels a more direct route to the customer's house and is no longer dependent upon potentially overloaded interconnection bottlenecks. And other content providers who rely upon Cogent and other content delivery networks will likely see an improvement as well, as Netflix traffic no longer places such a significant burden on transit network links.

Far from signaling a problem, Netflix's direct interconnection agreements demonstrate the robustness of the interconnection market. When the company's quality suffered as the result of an interconnection dispute, it selected a more efficient agreement from among myriad options to mitigate its exposure. Like multi-homing, secondary peering, and content delivery networks, this direct interconnection agreement shows how a fluid interconnection market can adapt in response to changes in external stimuli. As Professor Yoo explains, these innovations stem from network providers' experiments with new ways to reduce costs and improve the quality of transmission of Internet content.[27] Absent evidence of a market failure, the Commission should be reluctant to assume significant oversight of such a robust, competitive marketplace, because additional regulation may ossify the current environment and disrupt this virtuous cycle of innovation.

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[25] Many of these transit and CDN providers deliver a broad mix of traffic to broadband networks, which makes it difficult for a broadband provider to use interconnection agreements as a proxy to price discriminate against certain content, such as video.

[26] Notably, many interconnection agreements contain a Service Level Agreement whereby the network guarantees a minimum level of quality, upon threat of financial sanction for noncompliance. Streaming media providers like Netflix, whose services are latency-dependent, may find SLAs valuable and may receive better SLA terms from broadband providers than intermediate transit providers.

[27] Yoo at 69.

II. Disclosure of Interconnection Agreements May Harm Competition

The Commission should be particularly reluctant to adopt rules that require public filing and disclosure of private interconnection agreements between networks. The proposal appears to improve transparency in a market that the Commission has not yet investigated at length. But it may have the unintended consequence of harming competition among peering and transit providers by reducing barriers to collusion by larger networks. Even absent collusion, disclosure is likely to adversely affect prices by reducing companies' incentives to discount. Numerous well-documented examples illustrate the negative effect that disclosure regimes can have on prices and competition. If regulators have reason to suspect that a specific interconnection agreement is likely to harm consumers or competition, antitrust law provides a sufficient remedy to investigate potential issues without risking competitive harm from industry-wide disclosure.

A. Disclosure of Private Interconnection Agreements Can Facilitate Tacit Collusion

1. Antitrust Law Recognizes the Risks of Price Transparency

At first glance, the benefits of a price disclosure regime can seem enticing. The model of perfect competition assumes that buyers have perfect information as to firm prices and predicts that markets will move toward uniform, competitive prices for comparable goods.[28] Increased access to firm pricing can reduce search costs for consumers hunting for the best deal.[29] It also may reduce a seller's ability to price discriminate,[30] although one might note that price discrimination itself has ambiguous effects on competition.[31]

[28] See, e.g., Maurice E. Stucke, *Evaluating the Risks of Increased Price Transparency*, 19-SPG ANTITRUST 81, 81 (2005).
[29] *Id.*
[30] *id.*
[31] see Herbert Hovenkamp, ANTITRUST LAW ¶ 2340c, at 13.

But increased price transparency can also have anticompetitive effects by facilitating the negotiation and enforcement of supracompetitive prices.[32] It is a "basic tenet in the economics and industrial organization literature" that "sharing information about cost, transaction prices, and other competitively sensitive information among rivals makes tacit collusion more likely."[33] For almost one hundred years, the United States Supreme Court has consistently recognized that "the exchange of price information among competitors carries with it the added potential for the development of concerted price-fixing arrangements which lie at the core of the Sherman Act's prohibitions."[34] "Regardless of its putative purpose," said the Court, "the most likely consequence of any such agreement to exchange price information would be the stabilization of industry prices."[35]

Federal antitrust authorities have also long warned about the potential anticompetitive risks of transparency among competitors. "A market typically is more vulnerable to coordinated conduct if each competitively important firm's significant competitive initiatives can be promptly and confidently observed by that firm's rivals. This is more likely to be the case if the terms offered to customers are relatively transparent."[36] While the sharing of information among competitors can be procompetitive, "in some cases, the sharing of information related to a market

[32] Stucke at 81.
[33] Joanna Shepherd, *Is More Information Always Better? Mandatory Disclosure Regulations in the Prescription Drug Market*, 99 CORNELL. L. REV. ONLINE 1 (2013). See, e.g., George J. Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44 (1964).
[34] *United States v. United States Gypsum Co.*, 438 U.S. 422, 457 (1978). See, e.g., *Am. Column & Lumber Co. v. United States*, 257 U.S. 377 (1921); *United States v. Am. Linseed Oil Co.*, 262 U.S. 371 (1923); *Maple Flooring Mfg. Assn. v. United States*, 268 U.S. 563 (1925); *Cement Mfrs. Protective Assn. v. United States*, 268 U.S. 588 (1925).
[35] *Gypsum Co.*, 257 U.S. at 457.
[36] Fed. Trade Comm'n & U.S. Dep't of Justice, HORIZONTAL MERGER GUIDELINES § 7.2 (2010).

in which the collaboration operates or in which the participants are actual or potential competitors may increase the likelihood of collusion on matters such as price."[37]

The FTC/DOJ Antitrust Guidelines for Collaborations Among Competitors offers three red flags to help identify when information disclosure may facilitate collusion.

- **Information about price**: "Other things being equal, the sharing of information relating to price, output, costs, or strategic planning is more likely to raise competitive concern than the sharing of information relating to less competitively sensitive variables."[38]
- **Current information**: "Similarly, other things being equal, the sharing of information on current operating and future business plans is more likely to raise concerns than the sharing of historical information."[39]
- **Individual Company Data:** "Finally, other things being equal, the sharing of individual company data is more likely to raise concern than the sharing of aggregated data that does not permit recipients to identify individual firm data."[40]

Of course, the proposal to mandate disclosure of individual interconnection agreements raises all three red flags: it would reveal real-time information about prices and costs of transit on a company-by-company basis.

2. The Mechanics of Tacit Collusion

[37] Fed. Trade Comm'n & U.S. Dep't of Justice, ANTITRUST GUIDELINES FOR COLLABORATIONS AMONG COMPETITORS § 3.31(b) (2010).
[38] *Id.*
[39] *Id.*
[40] *Id.*

Price transparency helps overcome the two primary barriers to collusion. First, the open communication of prices reduces the uncertainty of negotiating a supracompetitive price.[41] Because overt communication about price collusion is prohibited by the Sherman Act, firms seeking to collude must overcome the difficulty of communicating indirectly to establish their target price. But as the *Container Corporation* Court explained, sharing current price data can solve this problem by signaling a target toward which others can move. In that case, suppliers of corrugated containers shared current price information upon request about the most recent price charged for a good.[42] The Court explained that "[t]he exchange of price information seemed to have the effect of keeping prices within a fairly narrow ambit" because "[k]nowledge of a competitor's price generally meant matching that price."[43] The result was a movement toward a stable, uniform price in violation of the Sherman Act.[44]

Once firms have established a collusive price, transparency also helps enforce the collusive agreement.[45] Here, as the Supreme Court has said, "[u]ncertainty is the oligopoly's greatest enemy,"[46] because of the difficulty of identifying and punishing cheaters. But price transparency eliminates that uncertainty and therefore facilitates enforcement: "If…every transaction is publicized immediately, all members of the industry will know when one has made a price cut, and each can retaliate on the next transaction. Knowledge that retaliation will be swift serves as a powerful deterrent to price cutting and therefore facilitates the maintenance of tacitly collusive prices."[47] Because market players know that any attempt at cheating will bring a swift response, they are less inclined to defect from the collusive price in the first place.

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[41] See Stucke at 81.
[42] *United States v. Container Corp.*, 393 U.S. 333 (1969).
[43] *Id.* at 336-37.
[44] *Id.* at 334.
[45] Stucke at 81.
[46] *Brook Group v. Brown & Williamson Tobacco*, 509 US. 209, 238 (1993),
[47] F.M. Scherer & David Ross, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 348 (1990).

The general risk of tacit collusion is magnified by several structural factors inherent in the interconnection market. The first is concentration of competitively important players. Collusion is easier when fewer firms need to cooperate.[48] Though there are roughly 35,000 networks in the interconnection market, disclosure proponents argue that only a handful of them need to cooperate to control interconnection rates to end-user broadband networks. If they are correct, transparency would ease efforts by those broadband network providers to collude on a market price for interconnecting to last-mile networks. Second, there are significant barriers to entry.[49] Building and operating a broadband network requires significant upfront capital, which helps insulate the collusive scheme from the threat of competitive entry. Third, providers enter into regular and frequent interconnection agreements, most of which govern only a small portion of total traffic carried over a network. This makes cheating less likely because there is little benefit from departing from the collusive price in a single transaction, and competitors can move quickly to punish any defector.[50] Finally, players in the interconnection market are customers as well as competitors; these multimarket contacts provide multiple pressure points with which to punish a cheater, which makes cheating less likely.[51]

Though interconnection markets differ somewhat from a typical wholesale transaction, the principles play out similarly. A broadband provider could attempt to communicate a collusive industry-wide interconnection rate to its rivals by insisting on that rate in a negotiation with a single content provider, and publicly disclosing the resulting agreement. Its likelihood of success would increase if the broadband provider is sufficiently large to command leverage in the

[48] See, e.g., John M. Kuhlman, *Nature and Significance of Price Fixing Rings*, 2 ANTITRUST L. & ECON. REV. 69, 71 (1968).
[49] *Id.* at 72.
[50] See James E. Hartley, *Market Definition in a Monopoly Case*, C695 ALI-ABA 99 (1991).
[51] See, e.g., Amalia R. Miller, *Did the Airline Tariff Publishing Case Reduce Collusion?* 53 J.L. & ECON. 569 (2010).

negotiation, particularly if the negotiation is with a relatively small content provider. Once the interconnection price is publicized, rival broadband providers can use that price as an anchor or target to guide their own negotiations with content providers. As other interconnection agreements are made public, the would-be colluders could monitor the success of their efforts in real-time and adjust their proposed price targets if necessary through successive interconnection agreements in an attempt to achieve their shared objective. The multitude of potential content providers with which to partner allows the process to be highly iterative and eases the ability to use individual transactions to determine initial success and monitor ongoing compliance. Enforcement of the collusive price can be done in myriad ways, including by changing the terms of peering agreements between broadband networks to ensure cooperation with the collusive market for interconnection with upstream content.

Moreover, the complexity of interconnection agreements can mask tacit collusion. Interconnection agreements can run hundreds of pages and contain thousands of terms. It is unclear to what extent disclosure will increase transparency of the market to members of the public who lack detailed familiarity with such deals. But this complexity can mask attempts by firms to communicate with one another in violation of the Sherman Act, though fine print and price quotes that lay deep within the text of these lengthy, complex agreements. Similar allegations lay at the core of the *Airline Tariff Publishing* case. The Federal Trade Commission alleged that certain airlines used an automated fare reporting system to coordinate fare increases by communicating via footnotes, start dates, and end dates that were publicly disclosed but were of little relevance to consumers or travel agents.[52]

B. Even Absent Collusion, Disclosure Can Negatively Impact Prices

[52] *Airline Tariff Publishing Co.*, 1993-2 Trade Cas. (CCH) ¶ 70,409 at 71,167 (D.D.C.).

Disclosure can also lead to rising prices without collusive action that would violate antitrust law. Even absent tacit collusion, transparency can have an anticompetitive effect based simply on the unilateral rational actions of market players. As the Court noted in *Brooke Group Ltd. V. Brown & Williamson Tobacco Corp.*, firms may set prices at "a profit-maximizing, supracompetitive level by recognizing their shared economic interests and their interdependence with respect to price and output decisions."[53] Particularly in concentrated markets, it is unsurprising to find that firms may set their prices based partly on strategic considerations about their competitors' behavior.[54] Absent some agreement among competitors, supracompetitive pricing that emerges from the unilateral actions of multiple market players does not violate the Sherman Act—though it has an adverse effect on customers and competition.

Price transparency undermines the likelihood that a particular firm will discount to gain a competitive advantage. As the Federal Trade Commission has explained, coordinated information sharing "can blunt a firm's incentive to offer customers better deals by undercutting the extent to which such a move would win business away from rivals."[55] Market participants typically offer discounts in an attempt to gain market share away from rivals. But a company is less likely to offer such a discount if competitors can quickly learn the details of the agreement and move to match.[56] Because it would be unlikely that discounting would gain share, firms would be less likely to do so.

Transparency also decreases the incentives for companies to price goods aggressively. When a firm lacks knowledge about its competitor's prices, it has incentives to offer low prices

[53] 509 U.S. at 227.
[54] Stucke at 81.
[55] Horizontal Merger Guidelines § 7.2.
[56] See Letter from Federal Trade Comm'n to Mark Formby, Representative, Miss. House of Representatives 9 (Mar. 22, 2011), available at http://www.ftc.gov/os/2011/03/110322mississippipbm.pdf (discussing anticompetitive effects of proposed state law mandating disclosure of price terms in pharmaceutical industry).

in an attempt to beat the "unknown" deal.[57] But when rival pricing is no longer unknown, "the incentive to outbid unknown price terms disappears."[58]

In broadband markets, the planes of competition among broadband providers includes both interconnection price and quality of service. One could argue that because consumption of Internet content is somewhat non-rivalrous, broadband providers lack some of the incentives to price aggressively in response to their rivals like typical wholesalers do. If AT&T offers a low interconnection rate to Netflix, for example, it is unlikely that Netflix will shift some of its volume away from Verizon as a result. But transparency could affect Netflix's likelihood of securing non-price features that affect the quality of the product as delivered to end-user consumers, such as the capacity and location of interconnection ports. AT&T could bid aggressively by taking technical measures to assure that Netflix traffic is delivered with fewer interruptions over its network, which allows it to tout superior network quality to both content providers and end-user consumers. But those incentives would be retarded if public disclosure allowed rivals to move quickly to counter, because AT&T would secure no demonstrable long-term advantage as a result of these efforts.

Notably, disclosure of interconnection agreements may also have anticompetitive effects on adjacent markets for content and applications. First, disclosure may make it easier for networks to price discriminate against particular content, because they could more easily identify the transit networks that targeted content providers use to deliver their traffic to the Internet, and can press for higher transit fees from those networks. Second, the disclosure of interconnection agreements will allow content and application providers access to competitively sensitive data about their rivals' transit costs, which can raise risks of tacit collusion in content and application

[57] Shepherd at 19.
[58] *Id.* (citing sources).

markets. Third, content and application providers who are concerned about protecting this information may contract with networks that are not subject to disclosure rules, such as CDNs, or they may attempt to self-provision transit service to avoid disclosing cost information to competitors, even in situations where it would otherwise be uneconomical to do so.

C. Case Studies

Several empirical studies have established that mandatory disclosure of competitively sensitive information can be associated with higher prices.

1. Railroad Grain Contracting

The Staggers Rail Act of 1980 deregulated much of the railroad industry and allowed railroads to enter into privately-negotiated contracts with shippers and receivers.[59] Concerned that the railroads were price discriminating against small shippers, in 1986 Congress mandated the railroads disclose publicly the "essential terms" of any agricultural contracts.[60] These terms included price, the identity of the customer, the origin and destination of the shipment, the length of the contract, volume requirements, prior contracts between the parties, and effective date.[61]

An empirical study showed that this disclosure obligation had a significant and adverse effect on the price for railroad shipping.[62] Prior to the 1986 disclosure obligation, rates for railroad transportation of wheat in the Plains states was declining, a finding consistent with other studies testing the effect of deregulation on railroad rates.[63] But this trend reversed sharply after the disclosure obligations took effect in January 1987. After controlling for exogenous forces, the study found that rates rose between 10 and 13.7 percent.[64] The authors conclude that

[59] Staggers Rail Act of 1980, Pub. L. 96-448, 94 Stat. 1895 (1980).
[60] See Pub. L. 99-509, § 4051 (1986).
[61] *Id.*
[62] See Stephen W. Fuller et al, *Effect of Contract Disclosure on Price: Railroad Grain Contracting in the Plains,* 15 WEST. J. OF AGRICULTURAL ECON. 265 (1990).
[63] *Id.* at 270-71.
[64] *Id.* at 271.

"contract disclosure and the increased reliance on posted tariffs facilitated rate coordination by the oligopolistic railroad industry, thereby leading to an increase in rail rates."[65] They note that this finding is consistent with earlier findings about rate disclosure in the inland barge industry.[66]

2. Ready-Mixed Concrete

In 1993, the Competition Council, Denmark's antitrust authority, gathered and published statistics on the transaction prices of individual firms for two grades of ready-mixed concrete in three regions within Denmark.[67] The Council took this action under authority granted to it by the Competition Act of 1990, which instructed the Council to combat suspected oligopoly collusion through measures designed to increase market transparency.[68] From October 1993 until December 1996, the Council sampled actual invoice prices from 18 production sites in three regions, and published this firm-specific price data quarterly in the hope of improving information for buyers (primarily building contractors).[69]

As in the railroad example, the unintended consequence of this disclosure regime was to facilitate collusion and raise prices. According to one study, average prices of reported grades rose between 15 and 20 percent in the first year following publication.[70] Prices also converged significantly across firms serving the same market.[71] The authors considered, but rejected, several alternative explanations for this dramatic increase, including business upturn, capacity constraints, and input prices.[72] Ultimately, the authors conclude, "the evidence presented in this paper indicates that the Danish Competition Council, by providing reliable price reporting

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[65] *Id.*
[66] *Id*. (citing J.T. Hong and C.R. Plott, *Rate Fixing Policies for Inland Water Transportation: An Experimental Approach*, 13 BELL J. ECON. 1 (1982)).
[67] See Svend Albaek et al, *Government-Assisted Oligopoly Coordination? A Concrete Case*, 45 J. INDUS. ECON. 429 (1997).
[68] *Id.* at 429-30.
[69] *Id.* at 432.
[70] *Id.* at 429.
[71] *Id.*at 430.
[72] *Id.* at 440.

services, has unwittingly assisted firms in reducing the intensity of competition and thereby allowed them to increase prices."[73]

3. Telecommunications

The Federal Communications Commission has also previously considered acknowledged that "[o]ne of the basic prerequisites for [] anticompetitive behavior is knowledge of a competitor's prices."[74] Beginning in 1983, the Commission discussed whether tariffing of nondominant telephone companies "impair[ed] competitive pricing, and facilitate[d] collusive conduct."[75] It noted that forbearance "involves less disclosure to competitors of carriers' rates and tariff conditions than streamlined regulation" and consequently would "eliminate[] a potential vehicle for collusive conduct and facilitate[] price discounting."[76]

The Commission expanded on these thoughts in 1985, explaining that "[t]he continuation of tariffs for forborne carriers [] presents an opportunity for collusive pricing by competing carriers. Since carriers can ascertain their competitors' existing rates and keep track of any changes in those rates by reviewing the filed tariffs, carriers may be encouraged to maintain rates at an artificially high level. Without forborne carrier tariffs on file, carriers may initiate price cutting or generally institute rates at a lower level to meet directly customer demand."[77] Although it ultimately concluded that the evidence was "inconclusive as to the issue of tacit price coordination among AT&T, MCI and Sprint," it concluded that to the extent that such

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[73] *Id.* at 441.
[74] *Competition in the Interstate Interexchange Marketplace*, 5 FCC Rcd. 2627, 2644 (1990).
[75] *In re Policies and Rules Concerning Rates for Competitive Carrier Services and Facilities Authorizations Therefor, Fourth Report and Order*, 95 F.C.C. 2d 554, 554 n.1 (1983).
[76] *Id.*at 554 n.3.
[77] *In re Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor, Sixth Report and Order*, 99 FCC 2d 1020, 1030 (1985).

coordination existed, it was "better addressed by removing regulatory requirements that may facilitate such conduct."[78]

D. The Possibility of Tacit Collusion Could Invite Costly Antitrust Scrutiny

Even if the disclosure regime ultimately has no actual anticompetitive effects, the proposed rule would impose substantial compliance obligations on the industry. Network providers must scrutinize interconnection agreements to assure that there are no antitrust concerns with disclosure, and that the agreements do not otherwise contain proprietary or competitively sensitive information. The disclosure obligation may also limit parties' flexibility when negotiating an interconnection agreement, because of concerns that any terms in the final agreement would be made public.[79]

Moreover, assuming the burden of these compliance costs provides no guarantee that the firm will avoid a costly antitrust investigation. As noted above, federal antitrust officials look skeptically at arrangements to share prices, particularly given the structural factors that mark interconnection markets. The routine exchange of such competitively sensitive information is likely to attract regular antitrust oversight and could trigger investigations of firms that are in fact innocent of wrongdoing. The fact that the Commission has mandated disclosure is not a complete defense if antitrust authorities suspect that parties are misusing the disclosure regime to illegally collude. Even a defendant cleared of any wrongdoing will incur substantial defense costs to clear its name.

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[78] *In re Motion of AT&T to be Reclassified as a Non-Dominant Carrier*, 11 FCC Rcd. 3271, 3314-15 (1995). See, e.g., Peter K. Pitsch and Arthur W. Bresnahan, *Common Carrier Regulation of Telecommunications Contracts and the Private Carrier Alternative*, 48 FED. COMM. L.J. 447, 484 (1996) (proposing private contracts as alternative to public tariff, to avoid potential price coordination).

[79] See, e.g., Geoffrey Manne, *The Hydraulic Theory of Disclosure Regulation and Other Costs of Disclosure*, 58 ALA. L. REV. 473, 482-484 (2007).

Finally, given how unsettled the law is in this area, even a firm with no malicious intent may unwittingly incur liability. Claims that a particular exchange of competitively sensitive information violates antitrust law are decided under the rule of reason, which requires the court to consider a "number of factors" to "divin[e] procompetitive or anticompetitive effects."[80] Canvassing the history of such claims, the Second Circuit noted that "[t]he state of the law on this issue was not always so clear."[81] Numerous commentators have noted that it is not much clearer today.[82] Given the risk that innocuous disclosures may give rise to antitrust liability, it seems unwise policy to invite the proceeding and suffer the attendant compliance costs and judgment risks associated with exchanging competitively sensitive information.

III. Antitrust Law is the Superior Forum to Address Concerns about Anticompetitive Interconnection Practices

Antitrust law provides regulators and the public with sufficient tools to detect and investigate particular interconnection agreements or practices that officials suspect may be anticompetitive. The Federal Trade Commission and the Department of Justice Antitrust Division have overlapping authority to investigate, and if necessary prosecute, anticompetitive interconnection practices, just like they can, and do, in other areas of the economy. And private plaintiffs such as content providers or networks who are harmed by allegedly anticompetitive practices can avail themselves of federal or state competition law to seek civil remedies.

There are multiple advantages to using targeted ex-post judicial proceedings rather than broad ex-ante disclosure rules to combat anticompetitive conduct. Through the discovery process, the relevant plaintiff will get access to the terms of the interconnection agreement and whatever other information s/he needs to investigate the validity of the claim. But the judicial

[80] *Todd v. Exxon Corp.*, 275 F.3d 191, 199 (2nd Cir. 2001).
[81] *Id.* at 198.
[82] See, e.g., Stucke at 81.

process provides myriad protections to minimize the risk that competitively sensitive information would be made public. For example, discovery may be permitted subject to confidentiality provisions or "attorney's eyes only" orders, backed by the power of a contempt proceeding. More generally, a targeted investigation is less likely than broad disclosure rules to be misused for anticompetitive purposes—and if the case proceeds to court, a neutral magistrate will preside over the case to assure that the proceeding is not abused.

Conclusion

Interconnection is a robust, competitive marketplace that has demonstrated a continuous ability to adapt in response to consumers' growing appetites for Internet-based products and services. Netflix's recent direct interconnection agreements with Comcast and Verizon reflect a broader trend toward alternatives to traditional transit service for delivery of significant volumes of Internet-based traffic, and should not, alone, raise public policy concerns. One may understand the impulse of some commenters to seek greater transparency in interconnection markets by mandating public disclosure of this and other interconnection agreements. But economic literature and almost a century of antitrust jurisprudence warn of the potential unintended consequences of such a rule. Disclosure of competitively sensitive information can create opportunities for tacit price collusion and even unilateral activity that raises prices to supracompetitive levels, as evidenced by prior experiments in the railroad grain and cement markets. Even without any actual anticompetitive effects, disclosure rules entail compliance costs and can lead to significant defense costs and potential liability. Traditional antitrust law provides a superior alternative to address specific instances of suspected anticompetitive conduct in the interconnection market.